VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Briefing Meeting for Stakeholders on DEQ/AAC Freshwater Nutrient Criteria Development Efforts

October 23, 2006
1:00 – 3:00 PM

Agenda for Stakeholders Meeting

- ***Welcome & Introductions - Alan Pollock***
- ***Status of Lakes & Reservoirs Nutrient Criteria; Timeline for Streams & Rivers Rulemaking - Jean Gregory***
- ***Discussion about the AAC Work Plan for Streams & Rivers Nutrient Criteria - Dr. Carl Zipper & Dr. Len Smock***
- ***VAMWA Suggestions – Clifton Bell***
- ***Stakeholder Questions/Comments - Alan Pollock***
- ***Adjourn***

Status of Lake & Reservoir Nutrient Criteria & Timeline for Streams & Rivers Rulemaking

Jean Gregory

Presentation to the Stakeholder Workgroup

October 23, 2006

Nutrient Criteria Development Plan

- ***Water Body Specific (Estuary, Lakes & Reservoirs, Rivers & Streams)***
- ***Three separate rulemakings (2002 -2009)***
- ***Preferred approach is effects based criteria for designated uses***
- ***Involvement from Academic Advisory Committee, Stakeholders, Ad Hoc Committees, Staff, Other States, Public, EPA***
- ***Fall-back approach is reference condition-based criteria refined for VA from EPA Region III regional database or VA STORET database updated with 2000 - 2002 monitoring data***

VA Schedule for Adoption of Nutrient Standards

1. 2005 Chesapeake Bay *(Completed)*

2. 2007 Lakes & Reservoirs (*Adopted 6-01-06; Estimated Effective Date 1-07)*

3. 2009 Streams & Rivers

4. TBS Wetlands & Ocean Side of Eastern Shore (*on hold until EPA technical guidance documents available*)

Regulatory Adoption of Amendments to the Water Quality Standards Regulation Takes 18 - 24 Months

AAC Recommendations for Lakes & Reservoirs

- **Natural lakes & constructed impoundments should be considered separately**
- **Protection of designated uses should be the basis for establishing criteria. Recreational fish population status can be an indicator of suitability for aquatic life.**
- **Chlorophyll *a* & total phosphorus recommendations were provided**
- **Nitrogen criteria should not be established**

Summary of Adopted Amendments for Nutrient Criteria in Lakes & Reservoirs

Special Standards for the Two Natural Lakes in Virginia*

- **Mountain Lake**
  (Chlorophyll *a* 6µg/l, ortho-P 8µg/l)
  Southwestern Virginia

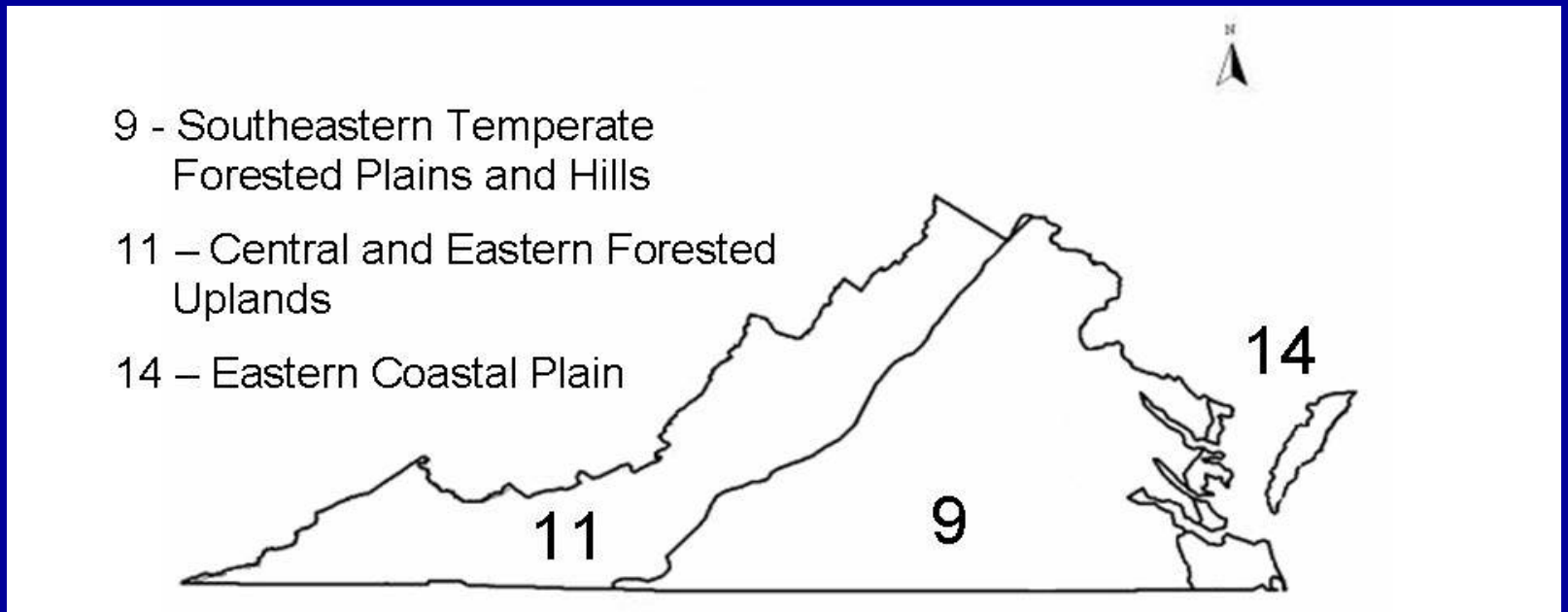
- **Lake Drummond**
  (Chlorophyll *a* 35µg/l, TP 40µg/l)
  Great Dismal Swamp Southeastern Virginia

***Based on Natural Background Concentrations**

Seasonal (April – October) Numerical Nutrient Criteria for 116 Impoundments Based on Fishery Type & Ecoregion*

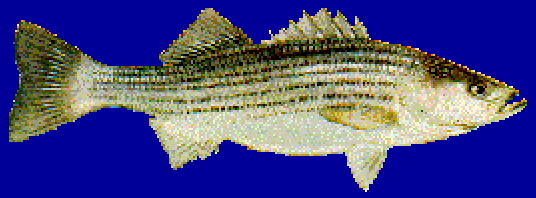
- **Chlorophyll *a***
- **Total Phosphorus** ***(applied only when documented use of algicides during the DEQ monitoring period of April 1 through October 31)***

*** Publicly accessible lakes > 100 acres in size & publicly accessible water supplies DEQ has previously monitored or plans to monitor**



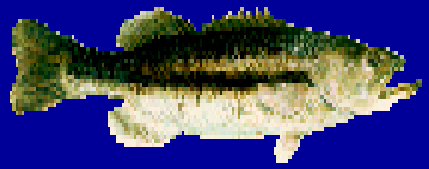
Lakes and Reservoirs
Fisheries Designated Uses
Ecoregion 14

Coolwater Fisheries



Chl-a = 25 ug/L
TP = 20 ug/ l

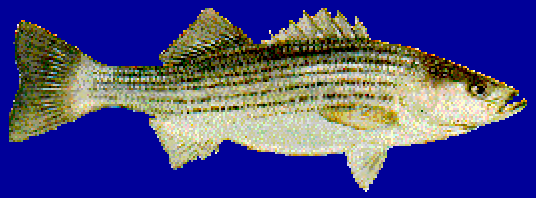
Warmwater Fisheries



Chl-a = 60 ug/L
TP = 40 ug/ l

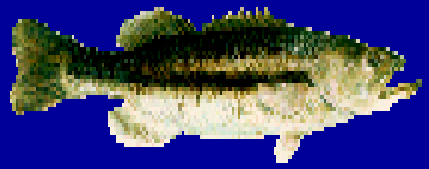
Lakes and Reservoirs
Fisheries Designated Uses
Ecoregion 9

Coolwater Fisheries



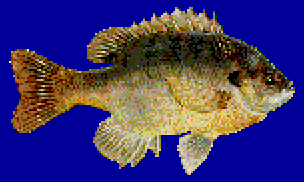
Chl-a = 25 ug/L
TP = 30 ug/ l

Warmwater Fisheries



Chl-a = 35 ug/L
TP = 40 ug/ l

Fertilized Lakes



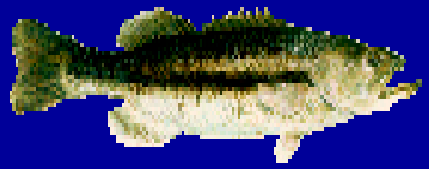
Chl-a = 60 ug/L
TP = 40 ug/ l

Lakes and Reservoirs
Fisheries Designated Uses
Ecoregion 11

Coolwater Fisheries

Chl-a = 25 ug/L
TP = 20 ug/ l

Warmwater Fisheries



Chl-a = 35 ug/L
TP = 40 ug/ l

Coldwater Fisheries

Chl-a = 10 ug/L
TP = 10 ug/ l

For 116 Impoundments, Dissolved Oxygen Criteria (4 mg/l min, 5 mg/l daily average):

- **Only apply to upper layer (epilimnion) in the lacustrine zone during times of thermal stratification**
- **Apply throughout the water column when not stratified**

Other Amendments:

- **Definitions for five terms introduced in the amendments:**
  - **algicides**
  - **epilimnion**
  - **lacustrine**
  - **man-made lake or reservoir**
  - **natural lake**
- **Allows for modifications to nutrient criteria for an impoundment if downstream water quality impacted**

Amendments (continued):

- **Water quality assessment of the nutrient criteria will be based on the two most recent monitoring years with available data.**

- **Allows for regulatory development of reservoir specific criteria if the designated fishery use is attained when nutrient criteria are exceeded.**

- **Retained extra protection provided by "Nutrient Enriched Waters" designation for the four lakes.**

Implementation Guidance

Under Development

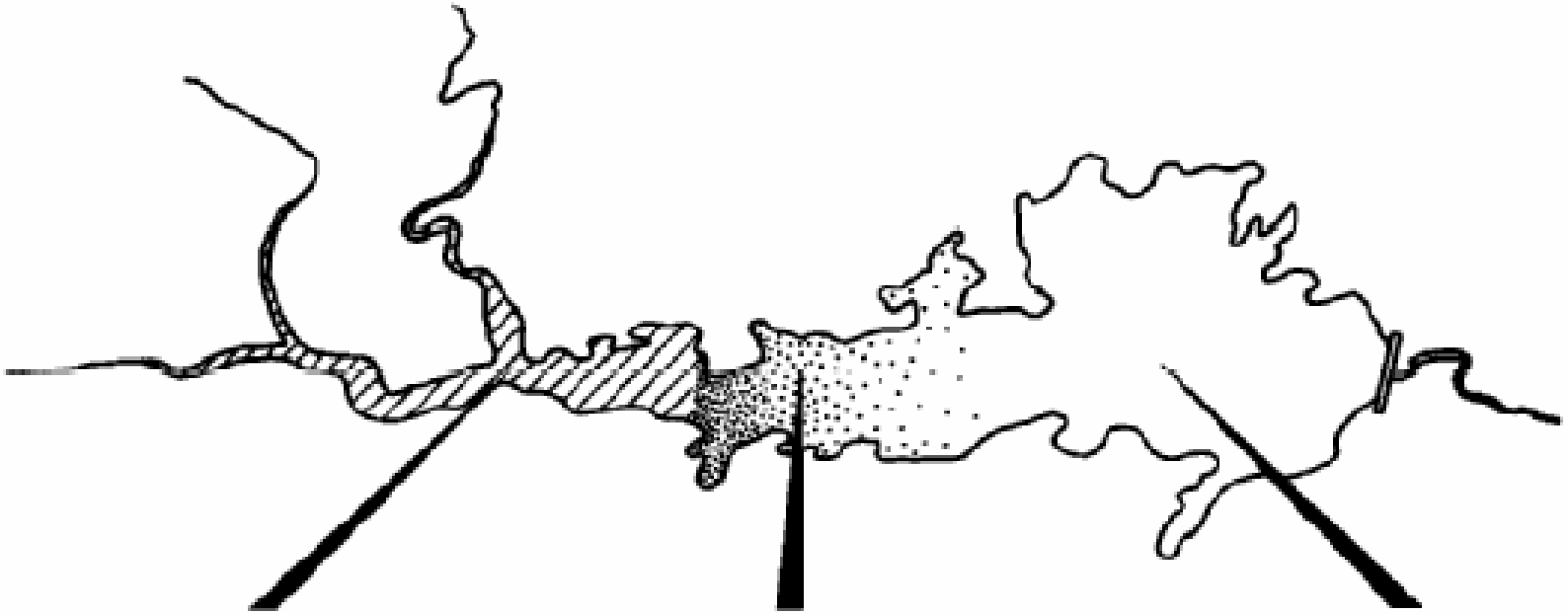
- Draft on DEQ web site at

http://www.deq.virginia.gov/wqs/documents/LAKEGUIDANCE_002.pdf

- Final by effective date of amendments

Key Issues in the Guidance

- *Monitoring*
- *Assessment*
- *Permitting*



RIVERINE ZONE
- Narrow basin
- High flow
- High suspended solids, low light
- High nutrients, advective supply
- Light limited photosynthesis
- Algal cell loss by sedimentation
- Organic matter supply allochthonous
- More "eutrophic"

TRANSITIONAL ZONE
- Broader, deeper basin
- Reduced flow
- Lower suspended solids, more light
- Advective nutrient supply reduced
- High photosynthesis
- Algal cell loss by sedimentation, grazing
- Intermediate
- Intermediate

LACUSTRINE ZONE
- Broad, deep lake-like
- Little flow
- Clearer
- Internal nutrient recycling, low nutrients
- Nutrient limited photosynthesis
- Algal cell loss by grazing
- Organic matter supply autochthonous
- More "oligotrophic"

Monitoring Issues

How to determine for each of the 116 impoundments:

- **Boundaries of the lacustrine zone** *(only zone where nutrient criteria apply)*
- **Thermal stratification** *(because DO criteria only apply to the upper layer during times of thermal stratification)*
- **Beginning of the riverine zone** *(to bracket the upper end of the reservoir for permitting purposes)*

Monitoring Issues (continued)

- **Specifies additional sampling in a subsequent year if impoundment sampled < 6 of the 7 months**

- **Guidelines to assure nutrient data collected (by DEQ & non DEQ entities such as citizen volunteer monitoring groups) are representative of the lacustrine zone**

Assessment for aquatic life (fishery) use of 116 man-made lakes & reservoirs

Dissolved oxygen:

- **During destratification, follow current 2006 guidance of assessing at 10% of pooled data of all samples within top or bottom layers**
- **During thermal stratification, assessment will be based only on 10% of pooled data for all samples within the epilimnion**

Chlorophyll a & total phosphorus (if documented algicide use):

- **Replaces combined TP/DO TSI approach used in 2006 for nutrient assessment**
- **Assess data from two most recent monitoring years separately; impaired for nutrients if exceed criterion in each of two most recent monitoring years**
- **Pool all data collected down to one meter in the lacustrine zone over all sampling observations made between April & October**
- **Calculate 90th percentile for Chl-a & median for TP**

Assessment of aquatic life use (fishery) for the two natural lakes

Dissolved oxygen:

- **Assessed at 10% of all pooled data of all samples at all layers**

Chlorophyll *a* & phosphorus:

- **Assess data from two most recent monitoring years separately; impaired for nutrients if exceed criterion in each of two most recent monitoring years**
- **Pool all data collected in any given year down to one meter in the lacustrine zone over all sampling observations made between April & October**
- **Calculate 90th percentile for chlorophyll *a* data & median for phosphorus**

Assessment Issues (continued)

- **Describes process for confirmation of use impairments when nutrient criteria are exceeded**
- **Defines 4 fishery types**
- **Provides table with location, fishery type, ecoregion, topo map identification & alternate names for each impoundment**

Permitting

- **No impact to the two natural lakes because there are no VPDES permitted discharges to these lakes.**

- **If there is a need for establishing VPDES permit limits in any of the 116 impoundments, year-round total phosphorus limits will be developed on a BPJ basis.**

Permitting (continued)

- **Only direct dischargers to the riverine, transition or lacustrine zones of the 116 impoundments are affected by the amendments, but a future TMDL may discover upstream dischargers that contribute to the nutrient impairment of the lake that will require advanced waste treatment to remove nutrients.**

- **The prohibition on mixing zones in lakes in 9 VAC 25-260- 20. B.4 is intended as a requirement for aquatic life toxics criteria. Total phosphorus is not considered a toxics criterion, so it will be implemented in the same fashion as conventional pollutants in lakes.**

Nutrient Criteria for Streams & Rivers

Timeline for Streams & Rivers

2006-2007: AAC/Technical Review Development

2008: NOIRA comment period & public meetings
Advisory committee
Proposal development
Board approval for public comment

2009: NOPC public comment & public hearings
Final revisions
Board approval
Submission to EPA for review & approval
Publication of effective date

Streams & Rivers
Nutrient Standards
Under Development

Academic Advisory Committee recommends:

- **Two major components to criteria development approach**:
  - **Criteria to protect individual stream segments from impairment (localized component)**
  - **Criteria to be applied only in stream segments that contribute nutrients to nutrient-impaired downstream waters (downstream-loading component)**
- **Initial recommendation that periphyton in wadeable streams & plankton in non-wadeable streams should be considered as the primary indicators of use suitability (but currently exploring use of benthic macroinvertebrates in wadeable streams & possibly fish in non-wadeable streams)**

Streams & Rivers AAC Workplan
Localized Component to Nutrient Criteria Development

- ✓ **Analyze ambient monitoring data to determine ecoregion reference values (25th percentile of TN, TP, chlorophyll a, & turbidity) using procedures comparable to the EPA analyses as fallback**
- ✓ **Review scientific literature: methods for defining undesirable (nuisance) algae levels**
- ➢ **Refine "screening value" staged approach for establishing localized nutrient criteria in wadeable streams & nonwadeable streams & rivers & monitoring resource impacts**

Streams & Rivers AAC Workplan

Downstream-Loading Component

- ✓ **Investigate the feasibility of using Chesapeake Bay modeling output to establish freshwater nutrient criteria for flowing waters that address downstream loading effects.**

- ➢ **Determine whether defensible nutrient limitations for downstream segments of streams draining portions of the state other than the Bay watershed are available, taking into account the nutrient criteria development in the states upstream and downstream from Virginia's rivers.**

- ➢ **Consider downstream loading effects to protect water quality when localized limitations (e.g. light) don't show impairments.**

Voluntary Monitoring Initiative

Benefits for Permittee

- Develop partnerships with the Community
  - Community sees the facility or PSA in a positive way
- Good stewardship
  - Upstream monitoring can serve as an early warning of pollution events

Benefits for DEQ

- Increased monitoring data
  - Monitoring data added to DEQ monitoring network
- High quality data
  - VPDES and water treatment facilities have knowledgeable staff, monitoring equipment, and laboratory space

Please see the flyer "Voluntary Water Monitoring by Permitted Facilities" to learn more

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Questions